KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GENERAL EDUCATION AND TRAINING

GRADE 8

NATURAL SCIENCES
PLC CONTROLLED TEST
2025 TERM 3

Time: 1½ Hours
Marks: 60

Instructions and Information

1. You must **answer all the questions**.
2. Read the instructions carefully, and answer questions as instructed.
3. Number your answers exactly as the questions are numbered.
4. Write neatly and legibly.

NB. This question paper consists of **6 pages** and contains **5 questions**.

SECTION A

QUESTION 1

Various options are provided as possible answers to the following questions. Choose the correct answer and only write down the corresponding letter (A-D) next to the question number (1.1 – 1.10), e.g. 1.12 B

1.1 A neutral object has…

A more protons than electron.
B more electron than protons.
C no protons or electrons.
D the equal number of electrons and protons. (1)

1.2 Which of the following materials is an insulator?

A Steel wool
B Glass
C Copper wire
D Silver (1)

1.3 What is the accumulation of electrical charges on an object referred to?

A resistance.
B friction.
C electrical force.
D static electricity. (1)

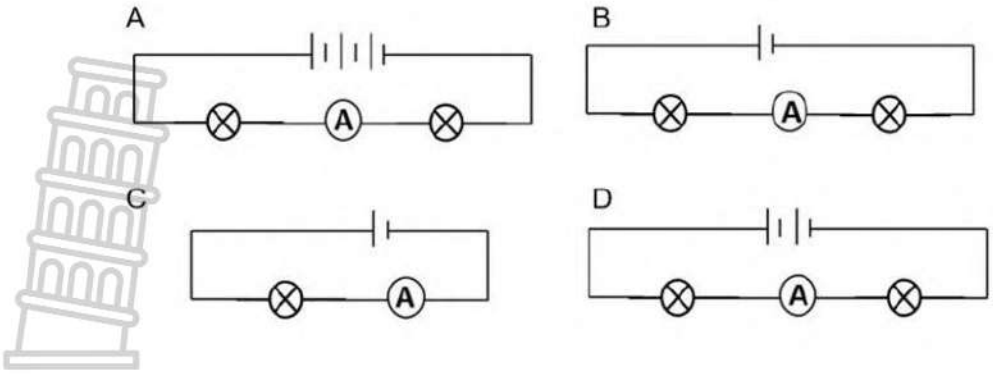
1.4 What are the energy conversions inside a circuit containing a cell and a buzzer?

A Chemical energy → electrical energy → kinetic energy
B Electrical energy → chemical energy → sound energy
C Chemical energy → electrical energy → sound energy
D Electrical energy → sound energy (1)

1.5 The diagram below shows …

A a series circuit.
B a parallel circuit.
C an incomplete circuit.
D an open circuit. (1)

1.6 All light bulbs in the following circuits are identical. Which circuit will have the brightest light bulb(s)?

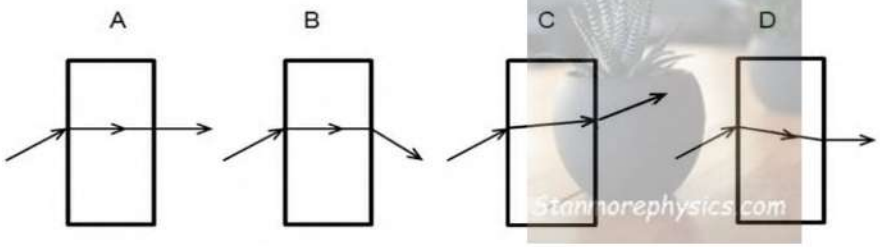


(1)

1.7 If the frequencies of different rays of visible light differ…

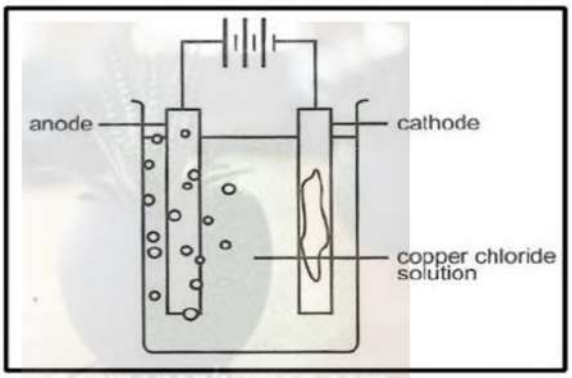
A the intensity of the light rays will differ.
B the colours of the light rays will differ.
C then refraction of these light rays becomes impossible.
D it is impossible that they all come from the same source. (1)

1.8 Which diagram show the path of a ray of light through a rectangular glass block?



(1)

1.9 What substance is produced at the anode in the electrochemical cell shown in the diagram?



A Oxygen gas
B Chlorine gas
C Copper metal
D Copper ions (1)

1.10 Which statement regarding visible light is FALSE?

A Pink is part of the visible spectrum of light
B Red light is reflected by red coloured objects.
C Violet light has the shortest wavelength of all colours of light.
D Light travels at 300 000 kilometers per second in a vacuum. (1)

[10]

SECTION B

QUESTION 2

Hansel, a grade 8 learner, charged a rubber balloon negatively by rubbing it against his hair. He then held the balloon against a brick wall and realised that the balloon was attracted to the wall to such an extent that the balloon got stuck to the wall.

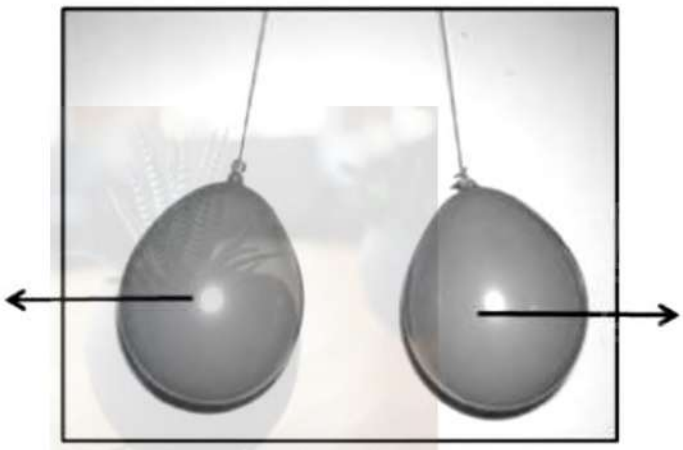
2.1 Define the term ***static electricity.*** (2)

2.2 Name the PROCESS of charging the balloon by rubbing it against Hansel's hair. (1)

2.3 Name the particles which are responsible for causing the NEGATIVE charge on that balloon. (1)

2.4 Draw the balloon and wall showing the charges on each, and explain how it is possible that a force of attraction can exists between the charged balloon and the NEUTRAL wall. (3)

2.5 Hansel now charges a second balloon in the same way as in the first part of his experiment. He then ties both the balloons to a piece of string and let them hang freely.



The two balloons push away from each other as they get closer to one another. Describe this observation. (2)

[9]

QUESTION 3

3.1 Two cells in series are connected to an open switch, a resistor and a buzzer in series.

3.1.1 Define the term ***resistor***. (2)

3.1.2 Draw a circuit diagram to represent the circuit above. (4)

3.1.3 Will the buzzer make a sound? Explain your answer. (2)

3.2 An investigation was conducted to find out what the effect of an increase in the number of LIGHT BULBS connected in SERIES is on the current in an electrical circuit. This investigation was conducted with the purpose to test the following hypothesis:

If the number of light bulbs (resistors) connected in series INCREASES, then the total current in the circuit will also INCREASE.

Procedure:

One cell, a switch, an ammeter and one light bulb were connected in series. The switch was closed and the ammeter reading was recorded. The experiment was then repeated, with two and then with three light bulbs connected in series. The different ammeter readings were recorded in a table.

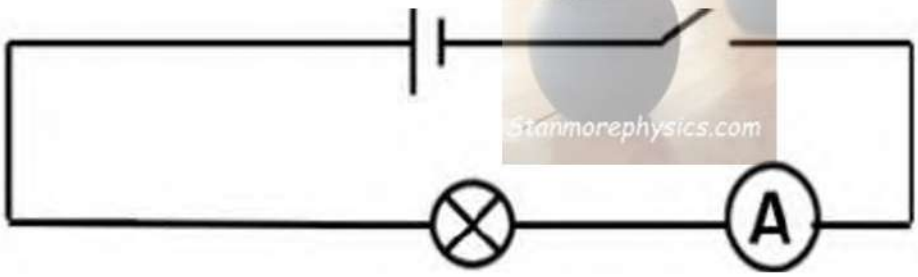


Table results:

Number of light bulbs connected in series	Current measured in Ampere (A)
1	0.3 A
2	0.2 A
3	0.1 A

3.2.1 Define the term ***electric current.*** (2)

3.2.2 Write down the INDEPENDENT variable of this investigation. (1)

3.2.3 Write down the DEPENDENT variable of this investigation. (1)

3.2.4 Do the results in the investigation confirm the hypothesis to be TRUE or FALSE? Explain your answer. (3)

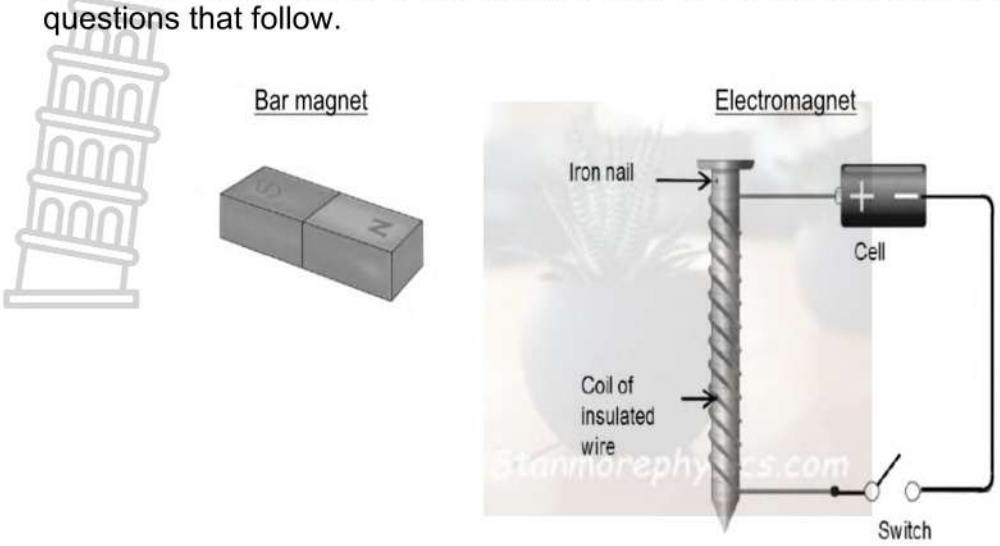
3.2.5 The ammeter is now placed between the cell and the switch before the same experiment is repeated. Will this affect the results of the experiment? Explain your answer. (2)

3.2.6 What would happen to the current reading if the same *three* light bulbs are connected in parallel? Give a reason for your answer. (3)

[20]

QUESTION 4

Study the diagrams of a bar magnet and of an electromagnet. Answer the questions that follow.



4.1 Which one of the two magnets is considered to be a permanent magnet? Explain your answer. (2)

4.2 Name one way in which you can increase the magnetic force of the electromagnet. (1)

4.3 When an old fashioned incandescent light bulb is connected to a circuit it starts to shine.

(1)

4.3.1 What effect of current is illustrated in this example?

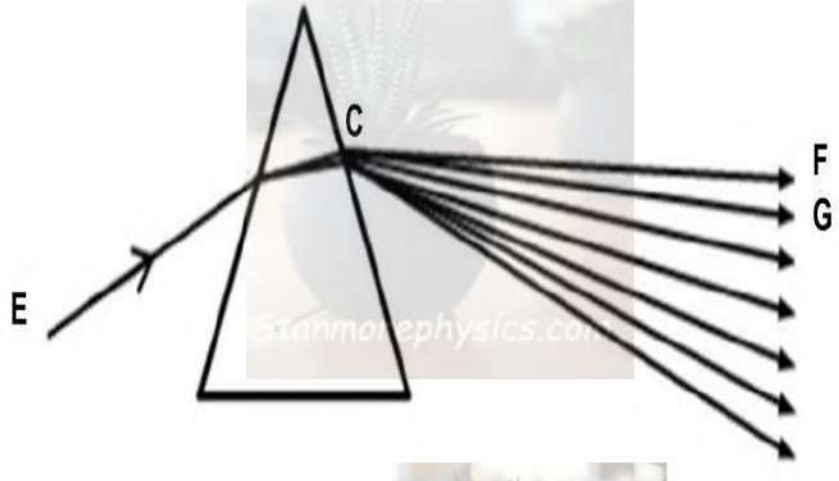
4.3.2 What happens inside the filament wire that causes the bulb to shine? (2)

[6]

SECTION C

QUESTION 5

5.1 The diagram below illustrates light passing through a triangular prism. Answer the questions that follow.

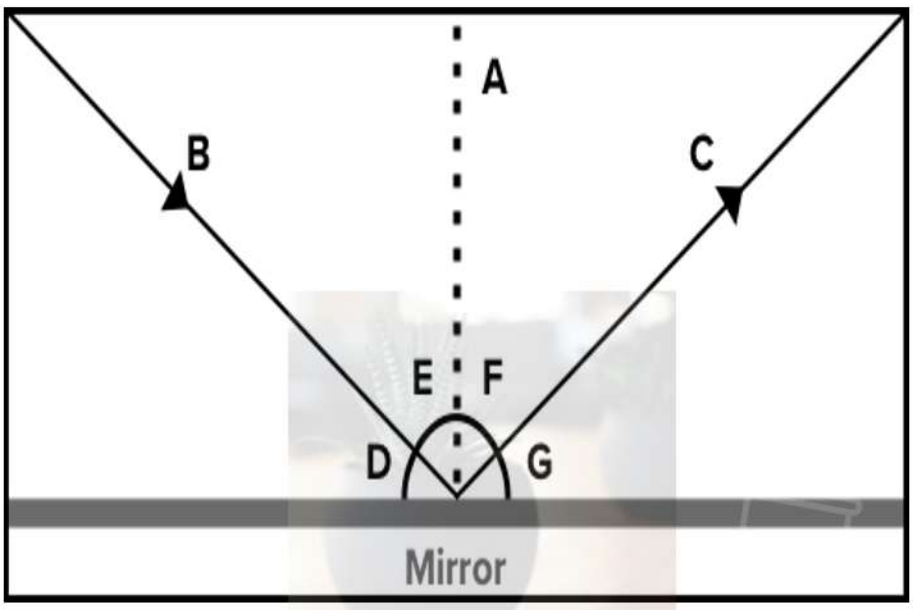


5.1.1 Name the colours of light represented by E, F and G. (3)

5.1.2 What happens at point C, where the ray of light exits the prism. (1)

5.1.3 Which colour of light has the longest wavelength? (1)

5.2 The diagram below shows light shining on a mirror.

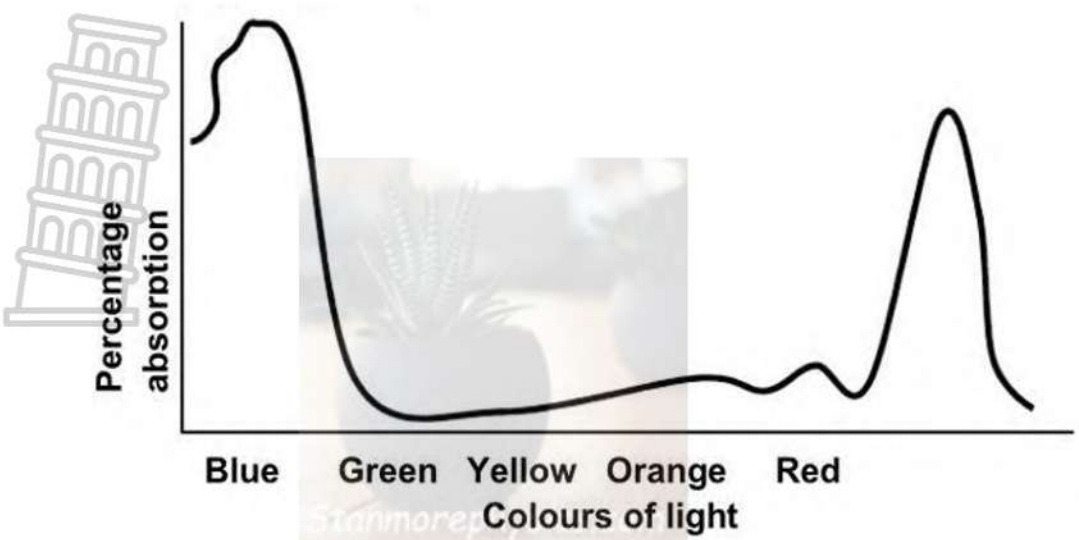


5.2.1 Label the diagram letters A, B, C. (3)

5.2.2 If the angle at G is 50°, calculate the size of the angle E. (2)

5.2.3 State (name and define) the LAW that helped you reach your conclusion in question 5.2.2. (2)

5.3 The graph below shows the percentage absorption of different colours of light by chlorophyll in green plants. Use the information in the graph to answer the questions.



5.3.1 Will a green plant be able to photosynthesise in green light? (1)

5.3.2 Explain your answer. (2)

[15]

Total Marks: 60

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This memorandum consists of **6 pages** excluding cover page

SECTION A

QUESTION 1

1.1 D✓ (1)

1.2 B✓ (1)

1.3 D✓ (1)

1.4 C✓ (1)

1.5 B✓ (1)

1.6 A✓ (1)

1.7 B✓ (1)

1.8 C✓ (1)

1.9 B✓ (1)

1.10 A✓ (1)

[10]

SECTION B

QUESTION 2

2.1 Static electricity is the build-up of electric charge on the surface ✓of an object/insulator. ✓ (2)

2.2 Charging by friction.✓ (1)

2.3 Electrons.✓ (1)

2.4

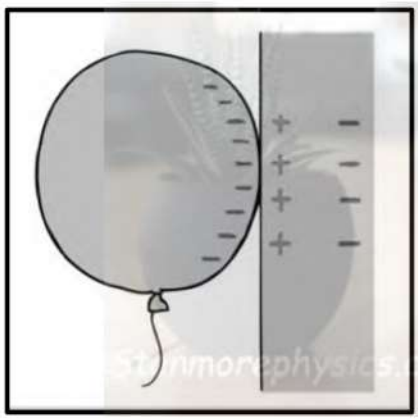

Diagram of negatively charged balloon and a polarized wall, where more positive charges appear closer to the balloon. ✓

Negative charges on the balloon repel electrons in the wall. ✓
The wall surface becomes positively charged, ✓ therefore attraction occurs. (3)

2.5 Balloons REPEL ✓ each other because both are negatively charged and like charges repel. ✓ (2)

[9]

QUESTION 3

3.1.1 A resistor is a component that opposes the flow✓ of electric charge. ✓ (2)

3.1.2 Correctly drawn circuit:

- Two cells in series ✓
- An open switch ✓
- A resistor in series✓ with a buzzer ✓ (4)

3.1.3 NO, ✓ There is no current flowing / The switch is open / The switch needs to be closed first. ✓ (2)

3.2.1 Electric current is the (rate of the) flow✓ of charge. ✓ (2)

3.2.2 Number of light bulbs (connected in series) ✓ (1)

3.2.3 Current / Ammeter reading ✓ (1)

3.2.4 FALSE ✓

The results show that increasing the number of light bulbs in series ✓will decrease the current✓ instead and not increase as stated. (3)

3.2.5 NO ✓

Current stays constant throughout a series circuit. ✓ (2)

3.2.6 INCREASE✓

When adding resistors in parallel, resistance decreases✓, therefore current will increase. ✓

OR

Adding more pathways ✓create more space for more current to flow. ✓ (3)

[20]

QUESTION 4

4.1 The **bar magnet** is permanent✓, while the electromagnet only works when current flows. ✓ (2)

4.2 Any ONE relevant answer, e.g.:

- Increase the number of coils ✓
- Increase the current
- Use a bigger cell (1)

4.3.1 Current can heat a resistance wire. ✓ (1)

4.3.2 While electrons move through the thin filament wire, they collide with the atoms inside the wire, which creates heat. ✓
When a filament wire becomes hot, it produces light. ✓ (2)

[6]

SECTION C

QUESTION 5

5.1.1 E – White light ✓
F – Red ✓
G – Orange ✓ (3)

5.1.2 Refraction✓ (1)

5.1.3 Red✓ (1)

5.2.1 A – Normal ✓
B – Incident ray ✓
C – Reflected ray ✓ (3)

5.2.2 F = 90° – 50° = 40° ✓
E = F = 40° ✓ (2)

5.2.3 The Law of reflection ✓ states that the angle of incidence is equal to the angle of reflection. ✓ (2)

5.3.1 NO ✓ (1)

5.3.2 Green plants / Chlorophyll reflects green light, ✓ therefore it cannot be used in photosynthesis. ✓ (2)
[15]

Total Marks: 60

BALANCED WEIGHTING GRID FOR NS GRADE 8 PLC CONTROLLED TEST SEPTEMBER 2025

QUESTION NO.	LOW ORDER	MIDDLE ORDER	HIGH ORDER	TOTAL
SECTION A - QUESTION 1				
1.1	1			**1**
1.2	1			**1**
1.3	1			**1**
1.4		1		**1**
1.5	1			**1**
1.6			1	**1**
1.7		1		**1**
1.8		1		**1**
1.9		1		**1**
1.10	1			**1**
				(10)
SECTION B - QUESTION 2				
2.1	2			**2**
2.2	1			**1**
2.3	1			**1**
2.4		1	2	**3**
2.5	2			**2**
				(9)
QUESTION 3				
3.1.1	2			**2**
3.1.2	4			**4**
3.1.3		2		**2**
3.2.1	2			**2**
3.2.2	1			**1**
3.2.3	1			**1**
3.2.4		3		**3**

3.2.5		2		2
3.2.6		1	2	3
				(20)
QUESTION 4				
4.1	1	1		2
4.2		1		1
4.3.1	1			1
4.3.2			2	2
				(6)
SECTION C - QUESTION 5				
5.1.1		3		3
5.1.2		1		1
5.1.3		1		1
5.2.1	3			3
5.2.2			2	2
5.2.3		2		2
5.3.1		1		1
5.3.2		2		2
				(15)
% IN EXAMS	40%	45%	15%	
TOTAL MARKS	24	27	9	60